REMARKS:

Applicants have received the two final Office Actions dated November 22, 2002 and August 18, 2003. In the above amendment, Applicants have replaced claims 9-16 with the new sets of claims 17-36. The above amendment responds to all the rejections discussed in the two Office Actions.

In the Office Actions, claim 9 and 15 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mano et al. (JP 06-012095) in view of Chennakeshu (U.S. patent No. 5,283,811) and Salami et al. (IEEE proceeding, vol. 6, No. 2, March 1998, pp. 116-130). Applicants respectfully submit that none of the references discloses or teaches the inventions recited in the newly added claims.

A speech decoder, which is the subject matter of new claim 17, comprises two decoding circuits that perform two-stage decoding procedures on parameters transmitted from a speech encoder. The first decoding circuit performs the first-stage decoding procedure in which excitation vectors are generated from the transmitted parameters. The second decoding circuit performs the second-stage decoding procedure in which a speech synthesis is performed to obtain a reconstructed speech, using the generated excitation vectors. Thus, in the speech decoder according to the present invention, the parameters yield the excitation vectors, which in turn yield the reconstructed speech.

The speech decoding device according to the present invention further comprises a vector modifier. The vector modifier is located between the first-stage and second-stage decoding circuits and modifies at least one excitation vector to enhance the perceptual quality of the reconstructed speech. Please note that the vector modifier modifies an excitation vector from the first-stage decoding before the excitation vector is used by the second-stage decoding circuit for synthesizing a speech.

Furthermore, the vector modifier modifies at least one excitation vector in such a manner as to obtain a variable degree of quality enhancement determined based on transmission errors found in the transmitted parameters. The degree of enhancement may decrease as the transmission errors increase (claim 22). One

of the ways to detect transmission errors is to count successive frames that contain a transmission error (claim 24). Thus, the degree of enhancement may decrease as the number of successive frames that contain a transmission error increases (claim 25). Also, it may be one of the enhancement practices that the degree of enhancement is fixed to one level or degree and that the enhancement is stopped or becomes zero when the number of successive frames that contain a transmission error reaches a predetermined number (claim 26).

None of the cited references discloses or teaches this variable modification of the excitation vectors. First of all, Mano does not even teach modification of the excitation vectors. Mano only discloses modification of parameters and a synthesized speech. In Mano, four modification procedures are performed on the parameters based on detected transmission errors. (See Fig. 5). Starting from the last paragraph on page 6 of the English translation, Mano discusses these four modification procedures in detail. In summary, Mano discloses that a parameter with an error is replaced with an interpolated or extrapolated parameter, using error-free parameters. In all of the four modification procedures, a modification is performed only on the parameters and not on the excitation vectors.

Starting from the second paragraph on page 10 of the English translation, Mano also discusses modification of the reconstructed speech. The modification of the reconstructed speech is performed by changing the filter coefficients of the post-filters. Again, the modification is performed on the reconstructed speech and not on the excitation vectors.

Chennakeshu is also silent about the variable modification of the excitation vectors. Salami does disclose the idea of modifying the excitation vector. (See Fig. 2). However, Salami is silent about the variable modification of the excitation vectors.

Other than the above cited references, the Examiner cited Ota et al. (JP 02-256308) in the Office Actions. Ota is also silent about the variable modification of the excitation vectors.

Claims 29-39 are also new claims drawn to a speech decoding method for

decoding transmitted parameters and reconstructing a speech. The reasons for patentability provided above for claims 17-28 are applicable to claims 29-39. More specifically, claim 29 comprises the steps of: (1) detecting....; (2) generating....; (3) modifying ....; and (4) performing ..... The sequence of steps (2)-(4) in claim 29 makes clear that the parameters yield the excitation vectors, which in turn yield the reconstructed speech.

For the reasons set forth above, none of the cited references discloses or teaches the variable modification of the excitation vectors recited in the present invention. Therefore, the present invention should be patentable over the cited references.

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